

THE SNAKES OF BOMBAY ISLAND AND SALSETTE.

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(With four plates and a text figure.)

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The layman's chief concern in regard to a snake is as to whether it is poisonous or not. As a rule he is indiscriminating and either increases the distance between himself and the reptile or deals it an exterminating blow after which, if interested, he sends us the mangled remains for identification and report. The victims frequently arrive at the Society's rooms and are examined and reported upon favourably or otherwise. A reference to the Society's records will show that a number of snakes so received are obtained within the limits of the Town and Island of Bombay, and the neighbouring Island of Salsette. I do not mean to imply that these delectable islands are particularly 'snakey' although many people might be misled into believing it when we consider that one of the City's most populous wards is named Nagpada—the hamlet of the Serpent, and that Nagdevi Street is so called after an old serpent shrine. To be exact however, out of over 300 different species of snakes found within the Indian Empire, thirty-six species have been recorded from the Islands of Bombay and Salsette and the surrounding seas. Of these sixteen, including ten sea snakes, are poisonous, the remainder may be classed as more or less harmless to man.

The Terrestrial Snakes of these Islands are all species inhabiting the Main Peninsular area of India; by which is indicated that area below the Gangetic plane and exclusive of the Southern and Western Region. Our snakes are the common snakes of the Indian plains. We can lay no claim to any hill species except to a single Pit Viper which has been recorded from Kheneri caves, where the chain of hills that bisects Salsette reaches an altitude of 1,500 feet—the highest point on these islands. The belt of low-lying land under tidal influence which encircles the coast, and also our rivers and creeks afford harbourage to certain aquatic species, found under like condition on the main land. Such snakes as are found within our dwellings will be found in a similar association with the human element in towns and villages of the Main Peninsula.

Snakes are divided into nine families, four of which are represented in the Islands of Bombay and Salsette. We will take them in their natural orders commencing with the lowest forms, the burrowing snakes, and passing to the most highly developed species the Vipers.

BURROWING SNAKES.

The burrowing snakes are poorly represented locally. There are four families of typical burrowing earth snakes but only one of them, the *Typhlophidæ*, is found on these Islands*. Its representative is a little snake which will be commonly found when digging earth in Bombay gardens. At first sight you would probably mistake it for a worm. It has the colour and appearance of an earth worm but if you took it up in your hands you would see its little forked tongue shooting out very rapidly, and if you examined it very carefully you would find that its body was covered with tiny scales. Lay it on the open palm of your hand and it will wriggle away in that typical snake like manner. You are now sure that it is a snake. This is the little blind snake *Typhlops braminus*. The eyes are very small, and protected by semi-transparent shields so as to be scarcely visible. The eyes of a snake are lidless. They vary in size from minute as in burrowing species, to enormous as

* On the road to Powai Lake in August this year I found the remains of a Burrowing Earth Snake (*Silybura* sp. Family *Uropeltidæ*). Identification of the species was impossible. Phipson's Burrowing Snake (*S. phipsoni*) occurs at Thana and very probably in the hilly portions of Salsette.

in some of the tree snakes. They are covered by a transparent cap which is likened to a watch glass. This transparent cap is apparently the lower eyelid which has become joined to the upper lid thus losing all mobility. The same feature is to be seen in certain types of Lizards in which the whole of the lower eyelid is composed of a transparent disc which in certain species fuses with the rudimentary upper lid. Burrowing snakes are said to be degraded members of the tribe which took to this mode of life at the early stage of evolution. In addition to the rudimentary eye of the Blind Snake, examination will reveal that in these snakes the large ventral scales have completely or partially disappeared. These would manifestly be an inconvenience in burrowing, and have therefore been either lost or modified. The food of the blind snake consists of earth worms and also of the larvae of ants. It is an inoffensive creature and will do no harm.

BOAS.

Our next family are the *Boidae*, i.e., Boas or constricting snakes. The *Boidae* are divided into two groups or sub-families, one include the Boas and the other the Pythons. The Boas are typically South American, the greatest of the tribe is the giant Anaconda, but certain genera of this subfamily are Asiatic, among these the *Eryx*. Two species of *Eryx* occur locally. The Red Earth Boa, *Eryx conicus*, and the Black Earth Boa, *Eryx jaculus*. Both these snakes occasionally form part of the local snake charmers outfit, particularly the Black Earth Boa. Like the bearded lady this snake is an object of wonder, for we are told that it has two heads—for six months one of these is in active operation, the other being apparently dormant, and at the end of the period the roles are reversed—a great convenience—it were a pity to spoil it but the phenomenon is explainable. The Black Earth Boa is a burrower. Your burrowing snake has apparently no neck, the body looks like a cylinder—the head really resembles the very short tail—the mouth is small and is placed under the projecting snout and is similar in shape and position to the vent, the eyes are hardly in evidence; thus the uncritical observer will have some difficulty in distinguishing the head from the tail. In habit the Black Earth Boa is extremely sluggish. The *Sampwalla* removes it from his little round basket and it lies inert upon the floor but when picked up it will coil itself tightly round your hand. Like all Boas it is a constrictor and kills its prey by crushing it. Rats and mice are its chief victims. Its temper is uncertain, the snake may lie inert and take no notice or it may make a sudden vicious and unexpected snap at you. The young of the Black Earth Snake is very differently coloured to his parent. One killed in Messrs. Phipson & Co.'s godown, Apollo Street, was a pale straw colour with three broad black bands in the vicinity of the tail. The uniform black colouring seems to be assumed with age. The Red Earth Boa (*Eryx conicus*) is sometimes seen with the snake charmer but not commonly, he is a rather handsome snake, brick red in colour rather blotched with white. The unpracticed eye might be misled into mistaking him for a Russel's Viper. He has the same heavy build and a rough imitation of the viper's colour and markings, but if turned on his belly the ventral scales will be found to be typically those of a burrowing snake. They are quite narrow and do not extend completely across the body as do a viper's. Like the black earth boa this species feeds chiefly on rats and mice. So much for the Boas.

PYTHONS.

The next to be dealt with are the Pythons. Unlike the Boas, the Pythons are typically old world species. The Common Rock Snake or Indian Python (*P. molurus*) is found in Salsette, and I have seen one killed beyond Parel. A specimen 12 ft. long was recently killed at Andheri, the reptile was roused from a hedge by a terrier, and in a very short time the snake had the dog firmly wrapped within its coils; the struggle took place on the edge of a tank, snake and

dog, in a struggling heap, rolled into the water, the cold douche seems to have damped the ardour of the Python who immediately loosed the terrier and in endeavouring to escape was killed. Under suitable conditions the common Python attains the enormous length of 20 feet, but our local specimens never average beyond 10 or 15 feet. Locally their chief food appears to be poultry and small animals. Pythons are voracious feeders and are capable of making an enormous meal. They are also capable of long fasts; one kept alive in the Society's rooms refused food for 10 months; his



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Lower extremity of a Python showing claw-like structures on either side of the vent. They are the terminations of the rudimentary hind-limbs.

record was however easily eclipsed by an individual in the Paris Zoo who is said to have gone on hunger strike for a period of two years and six months. The power most snakes possess of swallowing prey greatly exceeding their own calibre is remarkably exemplified in the Python. A writer in the *Asian* records having disposed of one that had swallowed a young wild boar, and the Society's journal records an instance of one that had swallowed a 6 feet panther! The distinguishing feature of all snakes is to be found in the structure of the jaws. If one has the opportunity of watching a snake swallowing its prey one discovers that its jaws possess the power of working independently, the right upper and lower jaw may be firmly closed on the victim while the left halves push forward in an attempt to obtain a fresh bite, the jaws of either side push forward alternately till the head of the victim enters the gullet, the muscles and ribs now come into play, the jaws then work in unison till the prey

is swallowed. The phenomenon is explained by the fact that the two halves of a snake's lower jaw are not rigidly attached to one another in front as is the case with other animals. The long lower jaw bones are connected in front by an extremely elastic ligament which gives them the power of independent action. An examination of a snake's skull also reveals the fact that the lower jaw bones are attached to the skull by ball and socket joints and held in position by means of elastic muscular bands so that in the act of swallowing the mouth can be widely opened. In most snakes, the bones of the upper jaws, and the palate are also mobile. This is not all, to aid the passage of the victim down the body of the snake there is a further peculiarity in the structure of the skeleton. In most animals the ribs rising from the spinal column are normally attached below the body to the sternum or breast bone, now snakes have no breast bone, the mobile ribs are therefore quite free below and are capable of being widely expanded. These peculiarities in the structure of a snake account for enormous differences observed in the relative proportion of the captor and its quarry. Snakes do not chew or masticate their food after covering it with saliva, they swallow it entire and the loosely attached and widely distensible jaws, and the expandible ribs are adaptations in its structure which enable it to accomplish the feat easily.

By many the Boas and Pythons are believed to paralyse their prey by a supposed power of fascination. It is a belief which must however be discredited. Observation has shown that the majority of animals possess no special fear of snakes; a duck placed in the python's cage will waddle unconcernedly practically into the jaws of the crouching reptile. I have seen a rat in a Russell's Viper cage squat himself amongst the coils of the snake.

Mr. H. M. Phipson has commented on this fact in his notes on the Python in the second volume of the Society's Journal. He writes "The rats on being placed in the cage appeared to take little or no notice of the snake. They would frequently run over the coils in their efforts to find their way out of the cage; and on occasion, when the snake remained quiet for a time they would frequently approach it, smell it, or even bite at it. The hens appeared to have even less instinctive fears of a snake and would if left to themselves for a short time commence scratching and picking up grains in the cage. The crows, on the other hand, showed considerable apprehension of the danger" (Phipson, Journ., B. N. H. S., Vol. II, p. 166).

The only animals that show a decided terror to snakes are monkeys and it has been concluded that human beings have inherited the fear of snakes from their anthropoid ancestors!

The family *Boidæ*, and more especially the Pythons are believed to be the ancestral group from which all other snakes have been derived. Pythons, like some of the burrowing snakes, display unmistakable evidence of their derivation from the more ordinary type of limbed reptile, by their retention, both internally and externally, of the vestiges of the hind limb. In the python a small pair of spur-like structures will sometimes be found in the neighbourhood of the vent, these are the rudimentary hind limbs. They are used by the Python as claspers when pairing (See Fig.)

COLUBRINE SNAKES (*Colubridæ*).

Passing over three families of earth snakes, the *Ilysiidæ*, the *Uropeltidæ* and the *Xenopeltidæ*, of which no representatives have been found in our islands,* we come to that large family of typical snakes, the *Colubridæ*, which numbers the majority of living snakes within its fold. This enormous family is divided into three great groups, the differences being based on the structure of the teeth. Three types of teeth are to be distinguished in snakes: solid teeth, grooved teeth and tubular or "perforated" teeth; in the grooved teeth an open channel or groove runs along the outer surface of the tooth, its object being to convey the

* *Vide* footnote on page 153.

secretion of the poison glands into the wound. The tubular tooth is merely a further development of the grooved variety, the groove being so deep that its sides meet and form a hollow tube: Grooved teeth with the open canal may be situated either in front of the jaws or at the back of the jaws. Tubular teeth are always in front. Colubrine snakes are therefore classed into groups in accordance with the type and position of the teeth. The first group is the Aglypha or solid toothed Colubrines. These snakes, like the pythons, boas and burrowing snakes, have solid teeth and may be regarded as non-poisonous.

But it must be remembered that the distinction correctly speaking is merely one of degree; experiments have proved that snakes of the family *Silyburidae* (Burrowing Earth Snakes) secrete a certain amount of venom in the parotid glands which, when mixed with the saliva, is sufficiently potent to enable these snakes to paralyze their prey, and the same may also be said of snakes of the genus *Zamenis* and *Tropidonotus*; in this respect all Indian snakes may be said to be poisonous, though comparatively few are harmful to man.

The second section of Colubrine Snakes is known as the Opisthoglypha or back-fanged Colubrines, snakes in which one or more of the hindermost teeth are grooved and channelled and connected with a small poison gland. This is quite a small group to which some of our tree and semi-aquatic snakes belong. They are only mildly poisonous, the venom being just sufficient to kill small mammals and birds on which these snakes feed. The last group of Colubrine snakes are the Proteroglypha or the front-fanged Colubrines which are far more venomous and include the deadly cobras, kraits and sea snakes. Representatives of all three colubrine groups are to be found on these islands. The solid-toothed Aglyphous Colubrines include the following genera: *Polyodontophis*, *Lycodon*, *Rhabdophis*, *Macropisthodon*, *Ptyas*, *Zamenis*, *Oligodon*, *Dendrelaphis* and *Chersydrus*. The Back-fanged Colubrines or Opisthoglypha include the tree snakes *Dryophis* and *Dipsadomorphus* and the two aquatic genera *Hurria* and *Gerardia*. The Proteroglyphous or front-fanged colubrines include the three Elapine Genera—*Callophis*, *Bungarus* and *Naja* (Coral snakes, Kraits and Cobras), and the *Hydrophiinæ* (Sea snakes).

SOLID-TOOTHED COLUBRINES (*Aglypha*.)

Let us commence with the solid-toothed snakes or Aglyphids. This series is divided into two sub-families—the *Colubrinae* or typical snakes and an aberrant division, the *Achrochordinæ*, whose members lead an exclusively aquatic existence.

The first of the *Colubrinæ* to attract our attention is the Common Wolf Snake *Lycodon aulicus*. This is perhaps the commonest snake in Bombay. It is to be found in the busiest centres of the City and is equally common in its suburbs. It is a slender snake, smooth and glossy in appearance, its colour varies from pale to deep glossy-brown, almost bluish-black in certain lights. Its back is ornamented with slender white rings arranged in pairs. Its lips and under surface are a glossy-creamy-white. This is the snake which is most easily mistaken for the Common Krait, so closely does it resemble the latter in colour and markings. The wolf snake generally takes up its quarters among loose brick work or in the rafters of ceilings, it is a wonderful climber, and very active in its movements, when freshly caught it will struggle vigorously and attempt to bite, but it is easily tamed and after a few days of captivity will submit readily to handling. It feeds chiefly on lizards. Some years ago we received a letter from a member stating that he had killed a snake with legs—the monstrosity arrived and on examination proved to be common wolf snake that had succeeded in swallowing a lizard several sizes too large for it. The victim in its vigorous struggles to free itself had forced its legs through the body of the snake.

Our next species is by no means a common snake in Bombay, we have only a single record of its occurrence. This is Jordon's Polyodont, *Polyodontophis*

subpunctatus, a slender snake, pale brown in colour with a line of black dots along the middle of the back.

Our next genera of Aglyphous snakes are *Rhabdophis* and *Nerodia*. One of each is found in Bombay, viz., the Buff-striped Keelback *Rhabdophis stolidus* and the Checkered Water Snake *Nerodia piscator*. The Buff-striped Keelback appears to arrive with the frogs on the advent of the monsoon and seems to disappear with them at the close of the rains. During the monsoon it is extremely common in the rice fields and tall grass, in fact it will be found anywhere where its food is plentiful. This consists almost exclusively of small frogs, and it is surprising the number of little frogs that one of these reptiles is able to account for. In disposition it is perhaps the gentlest snake that it is possible to find, even a freshly caught specimen will never attempt to bite, although it will struggle vigorously for freedom. In colour it is a deep purplish-brown, a buff coloured stripe runs along the entire length of each side of its body, the underside is creamy-white, certain individuals have the underside of the throat and lips a bright yellow; it is a slender graceful long-tailed snake, easily tamed and easily kept in captivity.

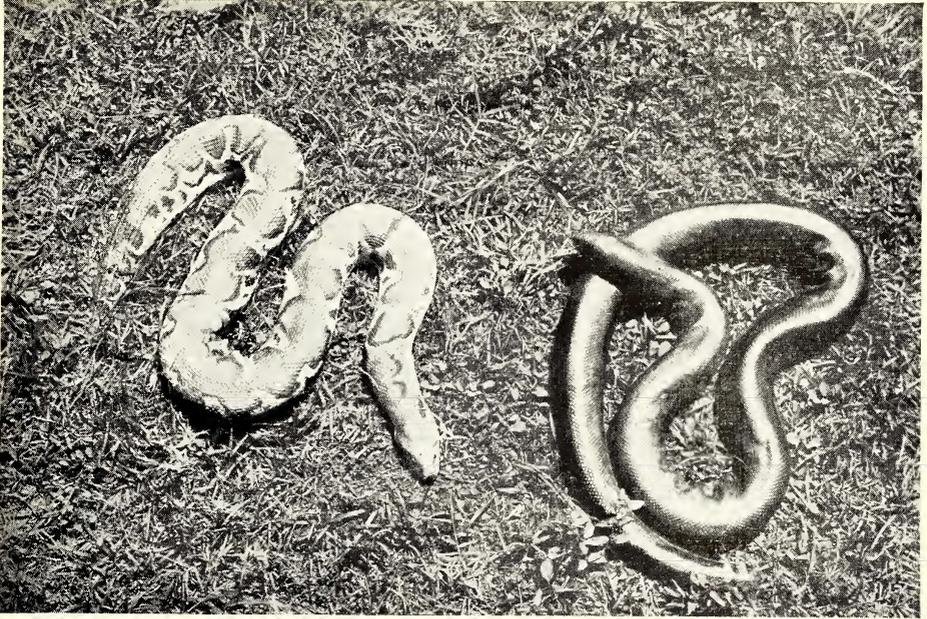
The Checkered Water Snake (*N. piscator*) is the common fresh water snake of all India. It is to be found in almost every pond, tank, or well. Its colouring is difficult to describe as the snake shows a great variation in colour and markings. The ground colour is usually a shade of green irregularly blotched with black, a dark check-stripe is always present running from the eye backwards to the angle of the jaws. The Checkered Water Snake is an active vigorous snake and when caught it will bite readily but, as with most snakes, a few days of captivity suffice to tame its spirit. It is one of the snakes commonly included in the collection of the local Snake-charmer.

Next follows a short, stoutly built, snake known as Green Keelback *Macropisthodon plumbeicolor*. The snakes known as keelbacks are so named because in such species the scales covering the back are provided with a longitudinal ridge or keel, sometimes with several keels; in species like the Phoorisa the lateral scales are furnished with serrated keels which being rubbed against one another produce a rustling sound. The Green Keelback is not a common snake in Bombay. We have only records of two specimens. Its colour is uniform grass green, but the young have a special livery of their own, this is rather exceptional as in snakes the young are usually similar in colour to the parent. The young green keelback affects a broad black chevron on the nape of its neck, the hinder portion of this marking is often outlined in bright yellow giving the young snake a handsome and striking appearance. The green Keelback is a ground snake found chiefly in grass land and open spaces. When alarmed it possesses the power of flattening its body to a remarkable extent and lying close pressed to the ground is thus able to escape detection. This power of flattening the anterior portion of the body is possessed by many Snakes and reaches its highest development in the cobra.

Two species of Dhaman or rat snakes are found in these islands, the Common Indian Rat Snake *Ptyas mucosus* and the Fasciolated Rat Snake *Zamenis fasciolatus*.

Local belief credits both these species with being the female cobra. As the cobra is at no loss to obtain a mate of his own species from the plentiful supply available, this slur on the marital relations of the cobras is unwarranted.

The Common Rat Snake is a vigorous fellow that grows to over 10 feet in length. It is quite a common snake in the City and the suburbs. In one of the by-walks of the Victoria Gardens I once interrupted the nuptials of a pair of Dhamans. The colour of this snake varies. Dark brown specimens are met with, sometimes tawny yellow to a light wheat colour, we have had a black Dhaman from Cumballa Hill, the under surface is yellowish white. A distinctive feature in the colouring of the dhaman is the marking of the labials—the



RED EARTH BOA.
(*Eryx conicus*).

BLACK EARTH BOA.
(*Eryx jaculus*).



THE CHECKERED WATER SNAKE (*Nerodia piscator*).

Photographs of plaster casts in the Prince of Wales' Museum.

(Photos by C. McCann.)



THE DHAMAN OR RAT SNAKE (*Ptyas mucosus*.)



THE COMMON KRAIT (*Bungarus candidus*.)

scales covering the lips,—the sides of the throat and belly. Each of these scales is outlined in black, and gives the snake a distinctive appearance, the eyes are large and bright and the neck narrow and distinct. The upper surface of the tail is sometimes covered with a net work of black markings. This is very distinct in some specimens and hardly noticeable in others. The Dhaman is capable of moving over the ground at a terrific speed. Snakes have been described as ‘rib walkers.’ The under surface of a snake’s body is covered with transverse scales called ventrals. Except in burrowing species and sea snakes these scales usually extend right across the body, and under the tail they sometimes divide into a double series. Now each of these large scales corresponds to a pair of ribs, and in gliding, the scales in the fore-part of the body are erected and obtain a purchase on the ground with the aid of the ribs, in such a manner that the rest of the body is drawn up behind. This method of progression explains the climbing power of snakes, and is no doubt true for slow movement but it does not account for the great speed at which certain species are able to cover the ground and it is thus claimed that the action of the muscles alone are quite sufficient to account for the movement of a snake without the ribs having to play any essential part. The Dhaman is a dangerous snake when brought to bay. It will literally fling itself at its attacker and, although non-poisonous, is capable of inflicting a severe wound. The principal food of the Dhaman consists of rats which accounts for its presence among dwellings.

The fasciolated Rat Snake (*Zamenis fasciolatus*) attains a length of about 3 feet and is quite a small snake when compared to the species just described, the colour is brown above, white below, the fore-part of the body is ornamented with cross bars consisting of brown or black spots encircled with white. Often these cross bars are not readily apparent and the snake presents a uniformly brown surface. On account of its general colour resemblance to the cobra, and perhaps also because of its power of flattening the anterior portion of its body when excited, natives speak of this snake as the female cobra.

The next species to be dealt with is that extremely handsome snake *Coluber helena*, the Trinket snake, the young of this species is particularly beautiful, the cross bar ornamentation of the fore-part of its body has been likened to a series of bracelets, each cross bar is composed of a chain of oval white spots outlined in black, these markings disappear towards the tail and in adult specimens are hardly in evidence at all. The ground colour of this snake is in varying shades of brown, there is usually a black stripe radiating from the eye to the lips sometimes two or three of these lip stripes are present. It is not a common snake in Bombay and we have had only one or two records of its presence on these islands. Though occasionally found among dwellings it is really a snake of the jungle. Specimens kept in captivity in our Museum have never survived very long; in disposition they were extremely active and easily roused to anger. Like other species of the genus these snakes kill their prey by crushing it in their coils before swallowing it.

We will now pass to the next genus of snakes the *Oligodon*, two representatives of which are found within our limits—these are the Banded Kukri Snake, *Oligodon arnensis*, and the Variegated Kukri Snake, *O. taeniolatus*; till quite recently the former snake was included under a separate genus *Simotes*, the Gods have now decided that the difference which divided these two genera do not really exist, so both are now combined under the one genus—*Oligodon*, where let us hope they will now remain content and happy. The Banded Kukri Snake (*O. arnensis*) is not very common in Bombay; it is a short smooth snake, the general colour being brown with distinct black cross bars, each of the bars being outlined in colour of lighter tone, the bars are more distinct on the back and break up in the sides of the body; the belly is white but each of the ventral scales have the lateral edges marked with black.

The Variegated Kukri Snake (*O. taeniolatus*) is also uncommon; it is similar in form to its banded cousin; its markings are however by no means so precise and regular. The prevailing colour is light brown with irregular shaped transverse dark markings, the costals or scales covering the dorsal surface are arranged in 17 rows while in the Banded Kukri Snake these scales are in 15 rows. The method of counting the rows of costal scales in a snake is by no means as difficult a task as one would expect—except of course when these are minute—an examination of these scales will reveal that their arrangement is very regular, being set in a series of transverse rows; with the point of a pin one is able to easily follow the alignment of a single row and count the number of scales of which it is composed.

The shape, arrangement and character of a snake's scales afford important characters for its classification. The scales covering the dorsal surface of a snake's body are known as costals. Those covering the belly are spoken of as ventrals, while those beneath the tail are described as subcaudals. These subcaudals may form complete plates, when they are described as being 'entire', or may be broken up into a double row of plates, when they are described as "divided." In the same manner the ventral scales may stretch across the whole width of the belly or they may be much narrower. In the latter instance, as far as our Indian Terrestrial species are concerned, the owner may at once be classed as non-poisonous. The shield covering the vent of a snake is known as the anal, it may be 'entire' or divided in two. The scales covering the head of a snake may be similar to those covering the body, as is the case in most vipers, but usually they are in the form of large, flat, juxtaposed shields, the shape, number and proportions of which furnish very important characters for distinguishing the various genera and species.

The local Aglyphous colubrine snakes hitherto described were chiefly ground species. The next snake to be dealt with is a typical tree snake, *i. e.*, the Bronze-backed Tree snake (*Dendrelaphis tristis*). If in peering among the branches of a tree you discover a long brown snake with a rather elongate head, very large golden brown eyes and a creamy yellow belly and a long tapering tail it will probably be an individual of this species. A closer inspection will reveal a yellow stripe running along each flank of the body to the commencement of the tail, and that the neck and fore-part are marked with a series of black streaks. On the back of the snake's head, between the two broad shields known as the parietals, there is a light yellow spot. and at the apex of each scale covering the body there is a minute depression or pit, these depressions are known as the 'apical pits', these pits are said to coincide with the termination of nerve fibres extending along the outer folds of the skin and are of frequent occurrence in snakes, and, in the absence of a satisfactory explanation of their character, have been termed 'Organs of a sixth sense'. Certain snakes are spoken of as 'flying snakes', from their ability to shoot down from a height and reach the ground at an angle, the body being kept rigid during the movement. From the character of its scales the Bronze-backed tree snake is said to include this habit among its accomplishment. Each scale covering the ventral surface of the snake bears a pair of ridges. These ridges have been likened to hinges; now the space between these ridges can be drawn in, making the belly deeply concave—this concavity of the under surface gives the snake the necessary support in its progress through the air; in the same manner a split bamboo would be supported if dropped vertically from a height. The Bronze-backed Tree Snake appears to me to be a very gentle snake, a conclusion I have arrived at from observation of specimens kept in captivity. Its principal food consists of lizards.

We have received specimens from Andheri and it will be found in the more wooded portions of Salsette.

The last of the Aglyphous Colubrines to be mentioned is the Rasp-skinned Water Snake, *Chersydrus granulatus*, a member of the subfamily *Achrochordinae*. As previously stated these snakes are purely aquatic being found in harbours and estuaries in purely salt or brackish water. The Granulated or Rasp-skinned Sea Snake is so called because its entire head and body are covered with close fitting granular scales, by which it may be recognised from other sea snakes whose heads are covered with flat shields. This is one of the commonest sea snakes found in Bombay harbour and is the one most frequently taken in the nets of the fishermen; it is our only non-poisonous sea snake. In common with other sea snakes this species shows the flattened tail and the almost complete absence of ventral scales, both characters being adapted to facilitate swimming.

BACK-FANGED COLUBRINES (*Opisthoglypha*).

We will now pass to the Opisthoglyphous or back-fanged Colubrines. Snakes of this class are to be regarded as mildly poisonous and are furnished with grooved fangs situated at the back of the upper jaw. They are divided into two groups—one, *Dipsadinae*, typical tree snakes, the other, *Homalopsinae*, contain species found in brackish water or estuaries. Two species of tree snakes are found locally. The Brown Tree Snake, *Dipsadomorphus triginatus* and the Green Whip Snake, *Dryophis mycterizans*. The Brown Tree Snake is fairly common in Salsette. Its general colour tone is grey, the body being irregularly blotched with brown and white. The chief peculiarity in its colouration is its striking resemblance to the saw-scaled viper (*E. carinata*); we have an example of each of these two widely different species in which the markings of one are an exact replica of the other, a point which bears out the danger of identifying snakes from the point of colouration alone. An examination of the scales will immediately reveal striking points of difference: the viper's head is covered with tiny scales, similar in conformation to those covering the body, the head of the tree snake is covered with flat shields, typical of colubrine species, this point alone will suffice to distinguish these two species.

The Brown tree snake feeds chiefly on lizards and it is a fairly common snake in Bombay and Salsette. The second typical tree snake is the Green whip snake (*D. mycterizans*), a very common species found in gardens within the city and all over Salsette, its colouring is entirely protective, being almost a uniform light green, the snake is most difficult to detect among foliage and its slender whiplike body coiled among the branches aids further in the deception; a further detail in the colouring is a yellow line pencilled along each flank; the head is long and narrow and ends in a pointed snout. Its disposition is fierce, on being disturbed the snake will rear up the fore-part of the body in a series of rigid curves, and widely expanding its jaws will present a most formidable appearance.

Its principal food consists of lizards, though specimens in captivity will feed readily on mice. As an Opisthoglyphous or back-fanged Colubrine, the Green Whip snake is mildly poisonous, the venom secreted in its salivary glands being sufficient to paralyse its victims. These are usually seized by the head, the snake hanging head downwards and darting unerringly at its prey.

The fourth subfamily of Colubrine snakes are the *Homalopsinae*, they are thoroughly aquatic back-fanged colubrines characterised by the nostrils being situated on the upper surface of the snout.

Two representatives of this group are to be found in our mud flats, estuaries and creeks; the commoner is the Dog-faced Water snake, *Hurria rhynchops*. This snake lives in the mud banks of creeks, rivers and estuaries; it has the power of accommodating itself to fresh or salt water. It feeds on fish. The colour is grey or olive-blackish above with more or less distinct cross bars, the under

surface is whitish with large black blotches and cross bars. The body is stout, the head very small and the snout covered with small shields, the scales being strongly keeled. The second species found locally is *Gerardia prevostiana*, Gerard's Water Snake. In colour it is dark olive above and white below with dark edges to the ventral scales.

FRONT-FANGED COLUBRINES (*Proteroglypha*).

We now come to the most important branch of Colubrine species, *i.e.*, the front-fanged colubrines which includes our deadly poisonous species. In these snakes the anterior teeth in the upper jaw are grooved or "perforated." The 'Proteroglyphous' snakes are divided into two groups, the Elapine snakes, including the terrestrial poisonous species, and the Hydrophine snakes including the sea snakes. To take the land snakes first.

I am afraid our poisonous snakes must at once be put on the blackest of black lists. In all India there are only five land snakes about the deadly virulence of whose poison there can be no question. We are guilty of harbouring 4 of the big five namely the Cobra, the Common Krait, the Russell's Viper and the Phooras or Saw Scaled Viper. To the list of our local poisonous land snakes must be added the Green Pit Viper (*T. gramineus*) and a small coral snake (*Callophis trimaculatus*) which has been taken in Bandra and Colaba.

To take the poisonous species individually, no one should need an introduction to the Cobra, he is invariably the star turn in every snake charmer's outfit. Our local species is the typical cobra with the spectacled hood. Calcutta favours the monocellate variety with a single white circle in the centre of the hood, and in Cutch, Kathiawar and Rajputana the Cobra one meets is usually uniformly black with no pretensions to any markings. Within the City limits the cobra, being a bureaucrat, resides amongst the high Government officials on Malabar hill, if you seek him further afield you will find him in the more plebian vicinity of Parel, and among the suburban villas of Salsette. Although it is possible to find him anywhere the cobra possesses a fondness for taking up his quarters in the neighbourhood of dwellings. Loose brick work, old walls and masonry afford him comfortable quarters and hence he is to be met with in gardens and out-houses. His principal food consists of rats and frogs, but not being averse to a diet of eggs, the proximity of poultry would appear an added attraction.

An extraordinary belief is current not only in India but also in Europe that snakes are in the habit of entering cattle sheds with the object of sucking milk from the cows—the belief provides your *gowlee* or milk man with an excellent explanation for the sudden shortage in the milk supply of a favourite cow or buffalo. The humble *gowlee* aside, I have had an honest gentleman go red in the face and stoutly maintain that he had actually caught and killed a cobra in the act! May he be forgiven—the feat is materially impossible!

I believe the cobra to be by nature a timid snake. One might meet with an aggressive individual, but, like most snakes, his first impulse on encountering man is escape. If this is denied to him he will probably rear up, expand his hood, and be quite prepared to do you in, but if left alone he will probably retire with good grace. You will recollect the canny individual who distrusted 'Alph Cheem's' morning ablutions and retreated tail first down the bath room drain! Instances are on record of our cobras being able to eject or spit out their venom. There is an African species which makes a habit of this, but the Indian cobra unless exceedingly aggravated does not usually indulge in this much-to-be-condemned practice. It should also be noted that young cobras are from birth quite capable of inflicting a mortal wound, being in tender youth—lively and irresponsible, they are more to be dreaded than their rather staid and sober minded forbears.

The Common Krait (*B. candidus*) possibly needs some description. As I said previously he is so apt to be confused with what is perhaps the commonest nonpoisonous snake in Bombay, *i.e.*, the Common Wolf Snake (*L. aulicus*). Both snakes in life are deep brown in colour. Both are finely marked with linear white rings or arches and the unpracticed eye would have some difficulty in telling t'other from which. A stricter comparison of the two species—a dead Krait is more suitable for this—will reveal certain quite obvious points of distinction. First as regards colour the white linear rings of the Krait will be found to be more in evidence at the tail end of the body, while towards the head they are wider apart and less pronounced. Exactly the opposite holds good in the Wolf Snake. Now look at the scales. In the majority of snakes the scales covering the dorsal surface, known as costals, are mostly uniform in shape and size, but in the Krait and a few other species the central row of scales running along the spine are enlarged and hexagonal in shape and stand out in contrast to their neighbours. This is one of the more obvious points which will serve to distinguish the Krait from Common Wolf Snake, the costal scales are uniformly shaped in the latter species.

Owing to the difficulty of collecting the venom in sufficient quantities the manufacture of antivenine to counteract the effects of Krait poison has not yet been undertaken, in fact the manufacture of an antidote to the venom of any poisonous snake depends entirely on the possibility of obtaining the particular venom in sufficient quantity. The Krait must be regarded as one of our deadliest snakes, yet in disposition, the common Krait may be set down as extremely timid. Col. F. Wall, the greatest authority on the subject in India, believes it to be one of the most inoffensive snakes, and states that it would take a great deal of provocation to make a Krait bite. The writer can corroborate this from first hand experience. Years ago two small boys succeeded in tying a vigorously protesting snake with a small piece of twine to the end of a stick, the operation was performed with much labour and trouble, and the snake brought home in triumph. The triumph was short-lived; authority, declaring the victim to be a Krait, administered deterrent castigation to the victors, but you will admit that the provocation was extreme and the snake without malice. Yet it is certain that a number of deaths from snake-bite in India are caused by the Common Krait. Periodically we have instances of this in Bombay, and quite recently a case, was reported from Parel in the local papers. Locally the Krait would appear to be a common snake, particularly around Parel, Bandra, Santa Cruz and in the outlying portions of Salsette. We also have records of Kraits killed at Malabar hill. The Krait shares with the Cobra a fondness for intrusion into dwellings in which instance it will usually take up its quarters in the roof or the ceiling. From Bandra a few weeks ago we received a battered Krait together with a communication from a gentleman stating that he had caught it in his bed and enquiring as to the suitability of the snake as a bed companion. In replying we endeavoured to make it clear that sleeping with Kraits was unhealthy and, as a practice, greatly to be discouraged. The Common Krait like other members of the genus lives chiefly on snakes. Specimens kept alive in the Society's museum subsisted exclusively on this diet.

The last of our Colubrine poisonous land snakes is a little Coral Snake *Callophis trimaculatus*, a specimen in our collection was taken at Bandra and another from Colaba. Practically nothing is known as regards the poison or the habits of this species. It is a slender snake attaining a length of about 13 inches, the colouring is a light bay, each scale with a brown dot, the head and nape are black with a yellow spot on each side, the belly is a uniform coral red and the tail has two black rings, a distinctive livery which ought not to be difficult to recognise.

As regards the sea snakes probably few of us ever meet with one. On the advent of the monsoon they are occasionally washed up on the beach at Back Bay, and bathers at Juhu might find them cast up in the sands. This does not imply that it is dangerous to bathe at Juhu. There may be dangers but this is not one of them. Sea snakes are not vicious and it is a mercy because they are all poisonous, the commonest sea snake in Bombay, *Enhydrina valakadien*, is said to be 6 times more virulent than the cobra. On an evil day during the monsoon I was inveigled into joining two others who were going out with the fishermen to the fishing stakes at the mouth of the harbour. Two weary hours our boat lay in a heaving sea moored to one of these stakes. The experience is never to be repeated. After an eternity the nets were drawn and the catch placed in the boat. The harvest included a number of sea snakes. These the fishermen seized and cast into the sea. They displayed not the slightest trepidation in handling the wriggling and writhing brutes which made no attempt to bite during their vigorous struggles for freedom.

In the systematic list appended below it will be seen that 10 different species have been recorded. The commonest is *Enhydrina valakadien*, the Jew-nosed Sea Snake, a robust fellow of an olive grey tint with black transverse bands. Another of the commoner species is the Yellow-bellied Sea Snake, *Hydrus platurus*, a very handsome snake this, with a bright orange belly and dark chocolate upper surface. A third species known as the Chittul (*Lioselasma cyanocincta*) heavily built, the head large and the fore part of the body cylindrical, the colouring is greenish olive banded with black. A distinctive trait in the build of many Sea Snakes is the extreme slenderness of the anterior part of the body as compared with the girth further back, the tail is always strongly compressed and paddle-like, all the scales are small and there are often no enlarged ventrals. The eyes are small with round pupils. The colouring of a Sea Snake is protective, as a general rule the dorsal surface is bluish-black, the colour descending to the flanks in bars which are separated by light toned inter spaces, the under-surface is similarly light in tone, the general pattern is said to harmonise with the rippled surface of the ocean, the dark upper surface renders the snake invisible from above; while the light under parts when projected against the light of the sky render it equally inconspicuous to enemies from below.

VIPERS (*Viperida*).

As regards the Viperine species we are guilty of harbouring three, the Russell's Viper (*V. russelli*), the Saw scaled Viper (*E. carinata*) commonly known as the Phoorsa, and the Green Pit Viper (*T. gramineus*). How marvellously efficient is the poison apparatus of a Russell's Viper! In Viperine snakes it reaches the highest development. It is the specialist's hypodermic syringe 'in excelsis.' First we have the reservoir in the shape of a large gland situated below and behind the eye for secreting the poison, the needle is represented by the hollow tubular fang, the connection between the needle and the reservoir is supplied by a duct which connects the poison gland to the base of the fang. Spare needles are provided in the shape of fangs situated either below or at the side of the fang proper ready for use should any damage occur to the fang in action. The fang may be erected or lowered at will, and when not in use is folded back and kept safe out of harm. When a snake opens its mouth to strike, the fangs are automatically erected, at the same time the poison gland is compressed by the powerful cheek muscles and the contents driven forward into the duct and down the hollowed fang and out at the opening near the point. You will note the contrivance is perfect and the venom is driven deep into the heart of the wound. In spite of its indescribably sinister appearance the Russell's Viper is really a handsome snake. Its colour is usually some shade of brown, ornamented along the length of the body by three rows or chains of oval spots of a deeper tone. Quite often these markings are finely outlined in white



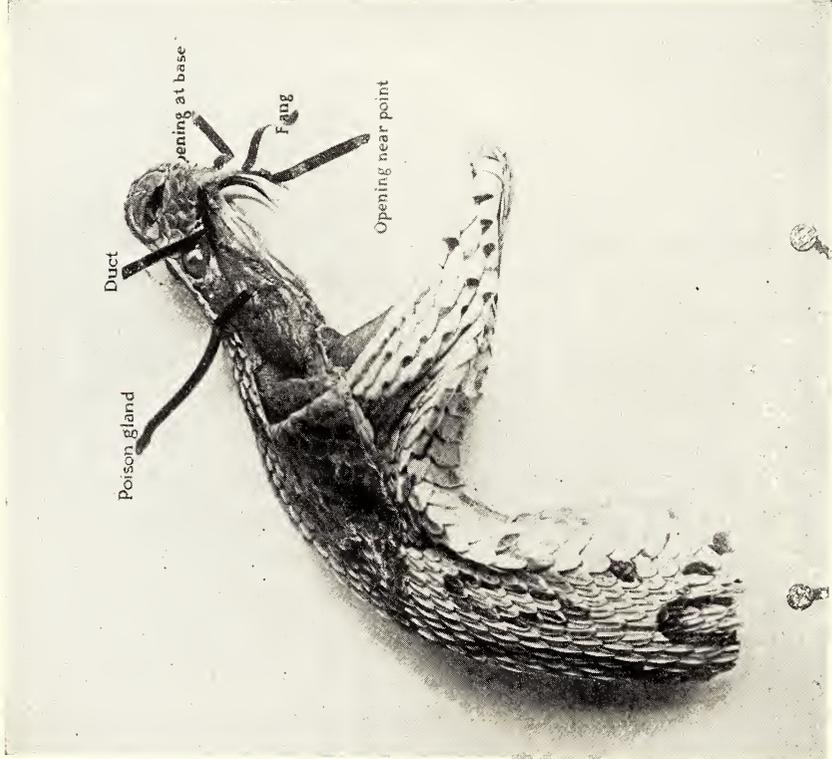
RUSSELL'S VIPER (*Vipera russelli*).



PHOORSA OR SAW-SCALED VIPER (*Echis carinata*).

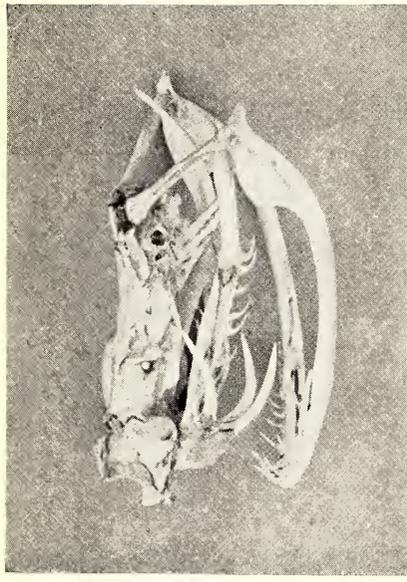
Photographs of plaster casts in the Prince of Wales' Museum.

(Photos by C. McCann.)

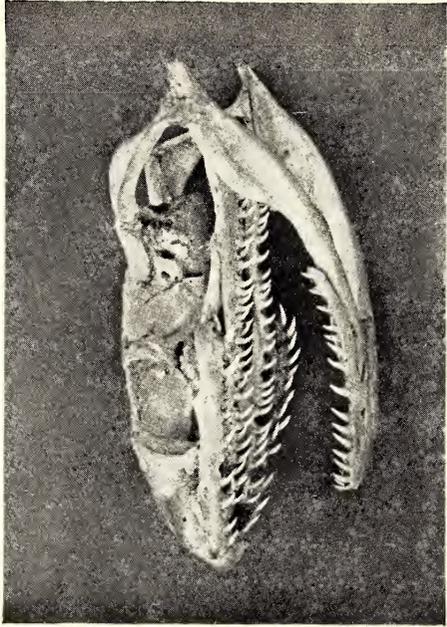


Poison apparatus of Russell's Viper (Lateral view).

Photos of exhibits in the Prince of Wales' Museum.



Skull of Russell's viper showing fangs that carry the poison.



Skull of checkered Water Snake (*N. piscator*) showing the relatively equal teeth none of which are grooved to carry poison.

but our local specimens do not usually show this additional ornamentation. In habit the snake is sluggish and morose showing a disinclination to move from a position it has occupied. It has a fondness for basking in warm sunlight, a habit it shares in common with most vipers. The Russell's Viper may be found anywhere, in fields, paths and open jungle, and often in the neighbourhood of dwellings attracted possibly by the presence of rats. Our records show specimens killed at Parel, Bandra, Andheri and Santa Cruz. It is an extremely prolific species. A gravid female kept alive in the Society's rooms presented the Museum with 60 young, all alive and kicking and all only a few shades less venomous than the parent. The Russell's Viper is one of our deadliest snakes, though cases are on record in which the bite has not proved fatal. Fortunately a serum is now manufactured which combines properties which will effectually counteract both the poison of the Russell's Viper and the Cobra. The serum is available at most Government hospitals and dispensaries and also at the Bacteriological Laboratory, Parel.

The "Phoorsa" or Saw-scaled Viper (*E. carinata*) does not attain a large size locally, rarely over a foot, but there is a great deal of iniquity within that small compass. One cannot say that it is a common snake locally. We have examples from Bandra, Andheri and Santa Cruz. The name Saw-scaled is derived from the fact that each of the tiny scales covering his flanks is provided with a central serrated, saw-like, ridge. When disturbed the snake adopts a pose which is characteristic. A reference to the accompanying photo will illustrate the snake's position in attack; when in this position the coils are continuously in motion rubbing against one another bringing the rough keeled scales into contact and producing a rasping sound which is quite audible. The demonstration is accompanied by continuous hissing, rapid vibration of the tongue, and a vicious darting forward of the head, the pose expressing the very embodiment of the motto '*Nemo me impune lacessit*' (Apologies to all Scotchmen). It is extraordinary how many people still believe that a snake's tongue is its 'sting.' The narrow forked tongue which the snake often protrudes is the seat of the sense of touch. It is often exerted with a rapid motion, sometimes with the object of feeling some object, as when a snake is examining its victim preliminary to swallowing it, and sometimes under the influence of anger or excitement. The colouring of the Phoorsa varies considerably and is generally in harmony with its surroundings. Our local specimens vary from reddish-brown—the colour approximating red earth—to a pale-buff. The back is irregularly blotched with markings of a deeper tone. Its disposition is vicious in the extreme, and it will bite on the smallest provocation. Specimens we have kept in captivity would hiss and strike at people merely standing by the cage. Their food in captivity consisted chiefly of mice and as an occasional relish, a centipede or a scorpion. The *Echis* is essentially a snake of open sandy places. Locally it will be found in fields, often in paths. Going to the Railway station from the Volunteer camp at Santa Cruz we discovered one of these snakes on a road adjoining the camp—death lurking in a path trod bare by many feet. Another that I met in Andheri was in the process of enjoying an afternoon nap on a bit of corrugated zinc forming the roof of a hen coop. The zinc was hot to the touch and the snake basking in the hot sun evidently enjoyed the added warmth from below—but he could not have approved of the terrific bang I caught him as he slept. As stated previously the saw-scaled viper has a very good mimic in the Brown Tree Snake (*D. trigonata*).

The Green Pit Viper (*T. gramineus*) in our area is probably restricted to the hilly portions of Salsette. A specimen was killed at the Kheneri Salsette Caves during the monsoons in 1920. The snake is easily recognised by its bright almost uniform green colouring, and its typical blunt viperine head covered with small scales and the 'pit' or hole between the eye and the nostril. In

habits it is almost entirely a tree, or more correctly bush, haunting species where its green colouring harmonises with the foliage, making it very difficult to detect. Green Pit Vipers we have kept in captivity in the Society's Rooms fed very readily on mice. The snake lies coiled on a branch with the head poised downwards and darts with lightning rapidity at its victim as it passes below. The mouse is held firmly in the snake's jaws until its struggles have ceased, after which the swallowing process commences. The method adopted is in marked contrast to the tactics of the Russell's Viper. That snake lies coiled in the corner of its cage and as soon as its prey comes within range the viper strikes and immediately releases its hold and takes no further interest in the proceedings, the snake appears to realize that its victim once injected with the fatal venom cannot be lying far off. It is only after the lapse of some time that the snake commences the search for its prey.

BOOKS ON SNAKES.

Appended is a systematic list of the snakes of Bombay and Salsette, in each instance I have given references to the literature in which descriptions of the appearance, habits, etc. of the species mentioned will be found. I have restricted these references to two works which are accessible to local Residents *viz.*, the Fauna of British India "Reptilia" by G. A. Boulenger, and Col. Wall's Serial on the Common Indian Snakes which appeared in the Society's Journal. The latter is profusely illustrated with coloured plates and diagrams. A simple chart for distinguishing poisonous from non-poisonous snakes has also been issued by the Society which will be found very useful as it helps those not fully conversant with the subject to recognise a poisonous from a non-poisonous species. There have been so many instances of people dying from sheer fright after having been bitten by a non-poisonous snake that a small chart readily understandable by the laymen will be found invaluable in instances of this nature. Col. Wall's "Poisonous Terrestrial Snakes" of India, which gives in greater detail the descriptions of Indian Poisonous Land Snakes, is profusely illustrated with diagrams, and further deals with symptoms of snake poisoning and its treatment, is a work which should be in the hands of every doctor or layman in this country. Copies of the chart may be had on application to the Society.

TREATMENT OF SNAKE BITE.

To the series of nostrums, charms, and mantras reputed to be sure and certain cures for snake bite there is no end. That a bite from any of our deadly poisonous species does not always prove fatal is certain, in such instances circumstances have generally prevented the victim from being injected with a fully lethal dose. Similarly people bitten by quite harmless snakes have submitted themselves to treatment whereby another marvellous 'recovery' is reported in the local press.

In the serum treatment for snake bite science has provided a remedy against the venom of certain snakes. Unfortunately the specificity of different snake poisons is such that the serum prepared from the poison of a given species is only potent against the venom of that particular species. Therefore in India we should require at least 6 different antivenines, *viz.*, serums for the Cobra, King Cobra, the Krait, the Banded Krait, the Russell's Viper and the Phooras. The impossibility of collecting poisons of all these species in sufficient quantities for the purpose of immunisation of large animals prevents the manufacture of antisera for these snakes with the exception of two, the Russell Viper and the Cobra. At the Pasteur Institute, Kasauli, a polyvalent serum is now prepared with a mixture of equal parts of Cobra and Russell Viper venoms. This serum is highly efficacious for both the poisons from which it is prepared but would be of little or no value for the bites of other Indian Poisonous Snakes. It is the only antivenine issued from this institute. Little is known in Bombay of the

facilities available locally for immediate treatment in cases of snake bite. I am indebted to Dr. D. A. Turkhud for the following note:—

“It is not generally known that the treatment with antivenine for cases of Snake-bite is available at the Bombay Bacteriological Laboratory, Old Government House, Parel, and that such patients are received there for treatment at any hour of the day or night. A number of cases of snake-bite are successfully treated in the Laboratory every year.

FIRST AID.

But before a case of snake-bite is sent, it is very necessary to see that a preliminary precaution is taken to prevent the injected venom from being rapidly absorbed into the body of the patient. This should be effected by applying a ligature at once to the limb above the seat of bite. A piece of bandage or a handkerchief should be used for this purpose, but it is well to remember that the ligature should be placed above the part of the limb which contains double bones. Thus, in the upper extremity the handkerchief should be tied above the elbow, while in a person bitten on the leg, the ligature should be placed above the knee-joint.

After this first aid has been rendered, the patient should be sent to the Laboratory with the utmost despatch, and if possible, a telephone message should also be communicated to the Laboratory (*Telephone No. 40979*) advising that a case of snake-bite is being sent for treatment. The snake if secured, alive or dead, should also accompany the patient.

The treatment consists of injections of antivenine given either subcutaneously or intravenously according to severity of the symptoms. The antivenine is efficacious against the venom of Cobras and Russell's vipers only; it is of no use against the bites of Kraits and Phoorsas.

Antivenine is kept in the Parel Laboratory for the treatment of cases only, and is not available for sale. Should any one wish to purchase it, he should indent for it direct from the Central Research Institute at Kasauli, near Simla, where it is manufactured. In every case, after recovery, slight sloughing invariably occurs at the site of bite; this should be treated with ordinary antiseptics.

The treatment of snake-bite with permanganate of potassium is not to be recommended; the experiments conducted by the late General Bannerman, I.M.S., have conclusively proved its inefficacy.

Sub-Order.—OPHIDIA.

Family.—TYPHLOPIDÆ.

Typhlops braminus (Daud.) *Common Blind Snake.*

Typhlops braminus (Daud.) Boulenger, *Fauna of British India*, Reptilia, p. 236; Wall, *Common Snakes of India*, Journ., Bom. Nat. Hist. Soc., Vol. XXV, p. 378. Description and coloured plate.

Bombay (A. M. De Cruz); Bandra, Bombay (B. N. H. S. coll.); Girgaum, Bombay (P. F. Gomes); Colaba, Bombay (S. H. Prater); Bandra, Bombay (H. M. Phipson), Journ., Bom. Nat. Hist. Soc., Vol. I, p. 84; *ibid.*, Vol. III, p. 49).

Form.—Worm-like; body covered with minute cycloid scales. Scales 20 round the body. Length 6-7 inches.

Colour.—Brown above, pale beneath.

* *Distn.*—*S. America*, Mexico. *Africa*, South of the Equator. *S. Asia*, Arabia to S. China and Coastal Islands, *Islands of the Indian Ocean*, Madagascar, Comoro, Mauritius, Cocos, Ceylon, Andamans, *Malay Archipelago*, Java, Borneo, Celebes, *Pacific Islands*, Ceram, Philippines, Guam, Formosa, Loo Choos. (Wall.)

° The *Distribution* notes are quoted from Col. Wall's "Hand list of Snakes" which contains the most recent information available in this respect.

Family—BOIDÆ.

Sub-Family—PYTHONINÆ.

- Python molurus** (Linn.) *The Indian Python or Rock Snake*. "Harr"
P. molurus (Linn.) Boulenger, Fauna British India, Reptilia.
 p. 245, Wall, Common Snakes of India. Journ., Bom. Nat. Hist.
 Soc., Vol. XXI, p. 447, Description and coloured plate.
 Andheri Salsette (S. H. Prater), Bombay (H. M. Phipson, Journ. Bom.
 Nat. Hist. Soc., Vol. III, p. 49).
Form.—Massively built, head flat, snout long, skin smooth and glossy,
 tail short and rapidly tapering. Length up to 20 feet, average 10-12
 feet. Scales 60-75 rows, ventrals 242-265, subcaudals 60-72.
Colour.—Yellowish, above, with a series of reddish-brown black-edged
 spots or blotches.
Distn.—*Ceylon. Peninsular India.* To the extreme limit of Sind. (Habb
 River). *Bengal Himalayas.* Dehra Dun to Sikkim. *Assam. Burma.*
Siam S. China and Coastal Islands. Malay Peninsula? Malay Archi-
pelago? Java. (Wall.)

Sub-Family—BOINÆ.

- Eryx conicus** (Schneider). *The Red Earth Boa*.
Gongylophis conicus (Schneid.) Boulenger, Fauna Brit. India
 Reptilia., p. 247, Fig.
Eryx conicus (Schneid.) Wall, Comm. Snakes of India, Journ., Bom.
 Nat. Hist. Soc., Vol. XXI, p. 2 descript. and coloured plate.
 Bombay (B. N. H. S. coll.); 2 Colaba, Bombay (Major Winter,
 R.A.M.C.); Parel, Bombay (Col. Bannerman); Colaba, Bombay (Lt.
 Jenkins, R.G.A.); Santa Cruz, Salsette (R. W. Dunlop); 2 Bombay
 (H. M. Phipson, Journ., Bom. Nat. Hist. Soc., Vol. III, p. 49); Bombay
 (Major Ward); Bombay (M. Chadwick); Bombay (Mr. Montgomery);
 Santa Cruz (Major H. R. James).
Form.—Stout, body short and heavy, tail short and blunt, skin rough
 owing to keeled nature of scales particularly above the tail. Length
 2 feet 9 inches. Scales in 40-55 rows, ventrals 162-196, subcaudals
 16-24.
Colour.—Reddish-brown with a broad zig-zag pattern or series of
 dark-brown, black-edged spots on the back. Lower surface creamy.
Distn.—*Peninsular India.* South of the Himalayas. *Baluchistan.* Fort
 Munro. (Bombay colln.) *Sind.* Larkana. (Bombay colln.) *Ganges*
Valley. Allahabad, Palair, Boxar, Naini Tal Dist. (Ind. Mus.)
 Behar. (D'Abreu.) *Lower Bengal.* Singbhum. Manbhum. Chaibassa.
 (Ind. Mus.) *Ceylon? Trincomalee? (Bombay colln.) (Wall)*
Eryx jacules (Linn.) *Black Earth Boa*. "Dô moo samp".
Eryx johnii (Russ.) Boulenger, Fauna Brit. India Reptilia, p. 248.
 Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc.,
 Vol. XXI, p. 12. Coloured Plate.
 2. Apollo Street, Bombay (B. N. H. S. coll.); Victoria Gardens
 Bombay (J. M. Doctor); Bombay (H. M. Phipson, Journ., Bom.
 Nat. Hist. Soc., Vol. III, p. 49.)
Form.—Stout, head small, not distinct from neck, snout projecting; tail
 short and blunt. Scales midbody 47-65, ventrals 189-213, subcaudals
 18-37. Length 3 feet 7½ inches.

Colour.—Adult, uniform black, young straw-coloured with indistinct transverse dark bands, 3 transverse bands usually distinct on the tail.

Distn.—*Peninsular India*. South of the Himalayas. *Baluchistan*. Hanna. Duki. (Quetta Mus.) *Sind*. Karachi. (Ind. Mus.,) Larkana (Bombay colln.), *Punjab*. Rajanpur. Pind Dadun Khan. (Ind. Mus.) Multan. Jullunder. Delhi. (Bombay colln.) Jhelum. (F. W.) *U. P.* Agra. (Ind. Mus.) Lucknow. (Bombay colln.) (Wall.)

Family—COLUBRIDÆ.

Sub-Family—*ACHOCHORDINÆ*.

Chersydrus granulatus (Schneider). *Rasp-skinned Water Snake*.

C. granulatus (Schneider) Boulenger, Faun. Brit. India, Reptilia, p. 335.

4 Bombay Harbour (S.H. Prater); 2 Bombay (B.N.H. S. coll.) 3 Bombay Harbour (H. M. Phipson, Journ. B. N. H. S., Vol. III, p. 49. Bombay Harbour (C. McCann.)

Form.—Body compressed stout, covered with small rhomboidal scales, about 100 round midbody, tail flat, paddle like, covered with small scales like body. Length 4 feet.

Colour.—Dark olive with pale rings.

Note.—Common in the harbour. Often washed ashore during the monsoon.

Habitat.—Coasts of India, from Bombay on the Malabar Coast and Hijli on the Coromandel coast to Tuticorin, coast of Ceylon, Burma, Andamans, Malay Peninsula to Cochin China, Malay Archipelago Papuaia (Wall.)

Sub-Family—*COLUBRINÆ*.

Nerodia piscator (Schneider). *The Checquered Water Snake*. “Pani Samp”

Tropidonotus piscator (Schn.) Boulenger, Fauna Brit. India Reptilia, p. 349; Wall, Common Snakes of India, Journ. Bom. Nat. Hist. Soc., Vol. XVII. p. 857.

Bombay (Col. Light); Bombay (P. M. D. Sanderson); Andheri, Salsette (K. R. Rane); Cumbala Hill, Bombay (Hon'ble Hill Trevor); Ghatkopar Salsette (H. Wise); Santa Cruz, Salsette (R. W. Dunlop); Andheri, Salsette (S. H. Prater); Bombay (Prof. J. P. Mullan); Malabar Hill, Bombay (Mrs. Bowen); 7 Bombay, H. M. Phipson. (Journ., Bom. Nat. Hist. Soc., Vol. I, p. 5; *Ibid* Vol. III, p. 51 *T. quincunctiatus*.)

Form.—Head oval, neck narrow, body stout, ridged owing to keeled condition of scales, tail round long and tapering. Scales in 19 rows ventrals 125 to 144, subcaudals 58 to 90. Length 4 feet 10½ inches.

Colour.—Variable, Ground colour dull green, olive green, olive brown, or brown of almost any shade dark or light. Some individuals are uniformly coloured, some show a checquering usually of black in the form of specks, spots or blotches.

Note.—Found in tanks, wells, streams and inundated rice fields.

Habitat.—*Ceylon*. *Peninsular India*. To Baluchistan in the extreme North-West. *N. W. Frontier*. To Malakand. *Western and Eastern Himalayas*. *Assam*. Abor Hills. *Burma*. As far North as Mansi, and Bhamo. *Andamans*. *Malay Peninsula*. *Siam*. *Indo-China*. *China* As far North as Fokien. *Malay Archipelago*. Sumatra. Borneo Java. *Formosa*. (Wall.)

Rhabdophis stolatus (Linn.) *Buff-striped Keelback*. "Nanati".

Tropidonotus stolatus (Linn.) Boulenger, Fauna Brit. India Reptilia, p. 348; Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc., Vol. XX, p. 603. Description and coloured plate.

Sion, Bombay (B. N. H. S. coll.); Bombay (B. N. H. S. coll.); Santa Cruz, Salsette (Mr. Framjee); Andheri, Salsette (S. H. Prater); Bombay (N. B. Kinnear); Santa Cruz, Salsette (Col. Forbes).

Form.—Slender graceful with a long tapering tail; eye large and round, iris golden; skin rough owing to keeled scales. Scales in midbody 19 rows, ventrals 125-161, subcaudals 50-85. Length 2 feet 6 inches.

Colour.—Brown of various shades deep to light, a buff stripe beginning at the neck runs along each flank to the tip of the tail, cross bars of deeper tone more or less in evidence, lips orange yellow.

Notes.—Common during rains, grass lands, inundated fields, gardens, mostly in proximity of water.

Distn.—*Ceylon*. *Peninsular India*. Up to about 5,000 feet. As far North as Sind. *N. W. Frontier*. (Malakand F. W.) *Himalayas*. *Assam*. North and South of the Bramaputra. *Burma*. As far North as Myitkyina. (Lat. 260° Long. 96·3°). South to Tenasserim. *Andamans*. *Nicobars*. *Malay Peninsula*. *Siam*. *China*. Yunnan. *Formosa*. *Philippines*. (Wall.)

Polyodontophis subpunctatus (Dum. & Dibr.) *Jerdon's Polyodont*.

P. subpunctatus (Dum. & Dibr.) Boulenger, Fauna British India Reptilia, p. 303.

Bombay (S. D. Navalkar).

Form.—Head short, indistinct from neck, eye small with round pupil, body smooth and slender. Scales 17 rows; ventrals 151-220; subcaudals 47-76. Length 17 inches.

Colour.—Pale brown above with a line of black dots along middle of back; a dark line or series of dots along flanks, head black, lips yellowish, bands of yellow above and below nape, belly scales flanked with black dots.

Note.—Rare locally.

Distn.—*Ceylon*, *Peninsular India*. South of Rajputana, and South of the Ganges Valley. (Wall.)

Macropisthodon plumbicolor (Cantor). *Green Keelback*.

Tropidonotus plumbicolor (Cant.) Boulenger, Fauna. Brit. Ind., Reptilia, p. 351.

M. plumbicolor (Cant.) Wall, Comm. Snakes of India, Journ., Bom. Nat. Hist. Soc., Vol. XVII, p. 1, descript. and col. plate.

Parel, Bombay (Parel Laboratory); Bombay (B. N. H. S. coll.).

Form.—Stout, tail short and tapering rapidly, skin rough owing to keeled scales. Scales 23-27 rows, ventrals 144-160, subcaudals 35-50. Length the 2½ feet.

Colour.—Uniform dull green with faint black markings, young with broad chevron-shaped collar bordered posteriorly with bright yellow.

Notes.—Rare. In grass land.

Habitat.—*India*. *Peninsular India*. Except the Ganges Valley. In or near elevated terrain usually up to 7,000 feet. *Punjab*. Ambala (Stoliczka). *Sind*. (Murray.) *Ceylon*. (Wall.)

Lycodon aulicus (Linn.) *Common Wolf Snake*.

Lycodon aulicus (Linn.) Boulenger, Fauna British India, Reptilia, p. 294; Wall, Common Indian Snakes, Journ., Bom. Nat. Hist. Soc., Vol. XIX, p. 87. Description and col. plate.

2 Bombay (B. N. H. S. coll.); Byculla, Bombay (S. H. Prater); Fort, Bombay (S. H. Prater); Colaba, Bombay (S. H. Prater); Cumballa Hill, Bombay (Raojee Kaneria); Girgaum, Bombay (P. F. Gomes); Malabar Hill, Bombay (W. S. Millard); Bombay (Capt. F. Hutchinson); Govt. Dock Yard, Bombay (B. N. H. S. coll.); Cumballa Hill, Bombay (E. C. Acworth); Apollo Street, Bombay. (Phipson & Co.); Malabar Hill, Bombay (G. A. D. Macbain); Bombay (In horse's shoe); Andheri, Salsette (W. F. Rutherford); Andheri, Salsette (S. H. Prater); Bombay (Mr. F. Powell); Malabar Hill (Mr. Harter); Bombay (Prof. J. P. Mullan).

Form.—Head, flat, snout, flat and depressed with swollen lips, spatulate in adult, body slender, skin smooth. Scales in 17 rows; ventrals 183-209, subcaudals 57-77. Length 2 feet 4 inches.

Colour.—Variable, uniform chocolate-brown with white linear bands or reticulations, lips white or spotted, belly white.

Notes.—Commonest snake in the locality, even in most populous areas in houses, store rooms, godowns and gardens.

Habitat.—Ceylon. *Peninsular India.* *Sind.* Larkhana. (Bombay coll.) *Himalayas.* Kulu to Sikkim. *Assam.* As far North as Dibrugarh. *Burma.* As far North as Myitkyina. South to Tenasserim. East to Shan States. *Andamans.* *Nicobars.* *Malay Peninsula.* *Indo-China.* *China.* Yunnan. Southern Provinces and neighbouring Islands. *Malay Archipelago.* Java to Timor. *Philippines.* (Wall.)

Pytas mucosus (Linn.) *Dhaman or Common Rat Snake.*

Zamenis mucosus (Linn.) Boulenger, Fauna. Brit. India, Reptilia, p. 325; Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc., Vol. XVII, p. 272. Description and coloured plate.

2 Bombay (N. H. S. coll.); Cumballa Hill, Bombay (Mrs. Montearth); Malabar Hill, Bombay (W. S. Millard); 1 Mahim, Bombay (11 feet 9 inches J. W. Mason); 1 Bombay (E. R. Jackson); 1 Cumballa Hill, Bombay (Uniform black, B. N. H. S. coll.); 1 Parel, Bombay (Col. G. Liston); Victoria Gardens, Bombay (*in copula* S. H. Prater, July); Andheri, Salsette (F. Hearn); Santa Cruz, Salsette (R. W. Dunlop); Borivili, Salsette (S. H. Prater); Bombay, (Prof. J. P. Mullan); 6 Bombay (H. M. Phipson, Journ., B. N. H. S., Vol. I, p. 4; *ibid* Vol. III, p. 51).

Form.—Head elongate, eye large and lustrous, body robust, tail long and tapering, skin smooth. Scales 17 rows, ventrals 180-213; subcaudals 95-146. Length 11 feet 9 inches, average 6-8 feet.

Colour.—Variable. Yellowish-brown, light wheat colour, a deep brown to black. Frequently black markings on posterior part of body. Scales of lips, sides of throat, belly and tail edged with black.

Notes.—Common. Fields, and in neighbourhood of dwellings.

Habitat.—Ceylon. *Peninsular India.* To the Himalayas. *Sind.* *Baluchistan.* *Afghanistan.* *Transcaspia.* *Assam.* North and South of the Bramaputra. *Burma,* *Andamans.* *Malay Peninsula.* *Indo-China,* *S. China.* Including neighbouring Islands and Formosa. *Malay Archipelago.* Java. (Wall.)

Zamenis fasciolatus (Shaw). *Fasciolated Rat Snake.* "Nagina".

Zamenis fasciolatus (Shaw). Boulenger, Faun. Brit. India, Reptilia, p. 327; Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc., Vol. XXIII p. 34. Description and coloured plate.

1 Bombay (S. D. Navalkar); 1 Santa Cruz, Salsette (R. W. Dunlop); Parel, Bombay (Col. Glen Liston); 1 Juvenm, Salsette (Col. Kirtikar). 1 Powai, Salsette (S. H. Prater).

Form.—Snout projecting, body, round and smooth. Scales 21-23 rows, ventrals 191-232, subcaudals 73-88. Length $3\frac{1}{2}$ feet.

Colour.—Ground colour: Brown, dark to light yellowish with narrow black cross bars edged in white. Adult uniformly coloured or marking usually evident in the posterior part of the body; belly and lips white or yellowish.

Notes.—Not common. Locally spoken of as the female cobra.

Habitat.—*Ceylon. Peninsular India.* To the base of the Himalayas. To Calcutta in the N. East. To the Punjab in the N. West. (Ambala, Bombay colln.) (Wall.)

Coluber helena (Daud.) *The Trinket Snake.*

C. helena (Daud.) Boulenger, Fauna Brit. India, Reptilia, p. 331: Wall, Common Snakes of India, Journ., om. Nat. Hist. Soc., Vol. XXII, p. 22. Description and col. plate.

1 Bombay (N. H. S. coll.); 1 Bombay (Revd. Fr. Dreckman).

Form.—Head narrow, snout blunt, body compressed. Scales 23-27 rows, ventrals 217-265, subcaudals 73-100. Length 5 feet 3 inches.

Colour.—Adult brown with cross bands of squarish black spots, a vertical black streak below eye, oblique streak behind eye. Young pale brown with black cross bands superposed with chains of white spots.

Note.—Not common locally.

Habitat.—*Ceylon. Peninsular India.* To Sind in the North-West, and Jalpaiguri Dist. in the North-East. *Western Himalayas.* Almora District. (F. W.) *Assam.* Naga Hills. (Samaguting. Ind. Mus.) (Wall.)

Dendrelaphis tristis (Daud.) *Indian Bronze-backed Tree Snake.*

Dendrophis pictus (Gm.) Boulenger, Fauna rit. India, Reptilia, p. 337.

Dendrelaphis tristis (Daud.) Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc., Vol. XIX, p. 775. Descrip. and col. plate.

Andheri, Salsette (B. N. H. S. col.). Andheri, Salsette (S. H. Prater.)

Form.—Head distinct from neck, eye large with round pupil, body long, smooth and slender, belly with marked ridges along either side, tail long and tapering. Scales in 15 rows, ventrals 163-205, subcaudals 110-150. Length 4 feet 4 inches.

Colour.—Bronze. A yellow stripe along the flanks from the neck to commencement of the tail.

Note.—Tree snake. In tree and scrub jungle. Uncommon.

Habitat.—*Ceylon. Peninsular India.* As far North as Sind (Brit. Mus.) *Bengal.* Jalpaiguri Dist. Kalna. (F. W.) *Eastern Himalayas* Darjeeling Dist. *Burma.* Mergui (Nos. 7684 and 7685, Ind. Mus.) (Wall.)

Oligodon arnensis (Shaw). *Banded Kukri Snake.*

Simotes arnensis (Shaw). Boulenger, Fauna Brit. India, Reptilia, p. 314. Wall, Common Snakes of India; Journ., Bom. Nat. Hist. Soc., Vol. XXII, p. 749, Descrip. and col. plate.

Bombay (B. N. H. S. coll.); Bandra, Bombay (N. B. Kinnear); Ville Parle, Salsette (Prof. J. P. Mullan). Bandra (A. Kirke Smith); Santa Cruz (Salim Ali).

Form.—Head short not distinct from neck, eye small with round pupil, body cylindrical. Scales smooth in 17 rows, ventrals 164-202, subcaudals 41-59. Length 24 inches.

Colour.—Greyish brown with regular black cross bands, an angular black band on the upper surface of the head between the eyes succeeded by a band on the back of the head and a third on the collar. Lower surface uniform yellowish.

Notes.—Uncommon.

Habitat.—*Ceylon. Peninsular India.* To Dera Ghazi Khan. (Bombay colln.) *N. W. Frontier* (Bannu. F. W.) *Western Himalayas.* Almora Dist. (F. W.) *Eastern Himalayas.* Nepal to Sikkim. (Wall.)

Oligodon taeniolatus (Jerd.) *Variiegated Kukri Snake.*

Oligodon subgriseus (D. & B.). Boulenger, Fauna Brit. India Reptilia, p. 321; Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc., Vol. XIX, p. 55. Descript. and col. plate.

2 Bombay (B. N. H. S. coll.); Bombay (Revd. Fr. Dreckman.)

Form.—Head short, body slender and rounded, the girth being evenly maintained throughout the body, tail short. Scales smooth in 15 rows, ventrals 160-218, subcaudals 38-56. Length 19 inches.

Colour.—Variable. Prevailing tone buff to brown with irregular shaped transverse dark markings.

Habitat.—*Ceylon. Peninsular India.* To Sind, Baluchistan, and N.W. Frontier. In the North-East to Bengal. (Karagola, Purnea Dist. Ind. Mus.). *Western Himalayas.* Garhwal Dist. (Dhikala. Ind. Mus.) (Wall.)

Series.—OPISTHOGLYPHA.

Sub-Family.—HOMALOPSINÆ.

Hurria rhyinchops (Schneider). *Dog-faced Water Snake.*

Cereberus rynchops (Schn.), Boulenger, Fauna Brit. India, Reptilia, p. 374; Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc., Vol. XXVI, p. 89. Descrip. and col. plate.

1 Bombay (B.N.H.S. coll.); 1 Bombay (F. Spencer); 1 Bombay (B.N.H.S. coll.); Juvem, Salsette (C. McCann); Mazagon, Bombay (E.R. Jackson); Bombay (Prof. J. P. Mullan); Juvem, Salsette (Revd. Fr. Dreckman); 4 Bombay Harbour (H.M. Phipson, Journ. B. N. H. S., Vol. III, p. 50); Bandra, Bombay (Mr. Kirke Smith); Backbay, Bombay (C. McCann).

Form.—Head narrow in front, swollen at the back, body stout, skin rough owing to keeled scales, tail short tapering rapidly to a blunt point. Scales 21-25 rows, ventrals 132-156, subcaudals 49-72. Length 3 feet 3 inches.

Colour.—Grey olive or blackish with black cross bars; lower parts white with black blotches.

Notes.—Common in local creeks and on the mudflats in fresh or salt water.

Habitat.—Coasts and tidal Rivers from Bombay to Indo-China. *Ceylon. Andamans. Nicobars. Malay Archipelago.* Sumatra to Celebes. Philippines. *Formosa.*

Gerardia prevostiana (Eyd. & Gerv.). *Gerard's Water Snake.*

G. prevostiana (Eyd & Gerv.) Boulenger, Faun. Brit. Ind., Reptilia, p. 379.

Backbay, Bombay (J. Mann.); Versova, Salsette (A. Coirodi); Chaupati Sands (Prof. J. P. Mullan); Sion, Bombay (Prof. J. P. Mullan).

Form.—Head small not distinct from neck, eye small with vertical pupil, body cylindrical, smooth scales in 17 rows, ventral 146-158, subcaudals 31-34.

Colour.—Above uniform dark olive, lower portion of sides whitish, belly white with dark edges to the scales.

Distn.—*Coasts and Rivers of India.* Alibag. (Bombay colln.) Bandora. (Brit. Mus.) Cannanore. (F.W.) *Burma.* Rangoon. (F.W.) Pegu. (Brit. Mus.) Amherst. (Ind. Mus.) *Ceylon.* Kelani River.

Sub-Family.—DIPSADINÆ.

Dipsadomorphus trigonatus (Schn.). *Common Cat Snake.*

Dipsas trigonata (Schn.) Boulenger, Faun. Brit. India, Reptilia, p. 358;
Dipsadomorphus trigonata (Schn.) Wall, Common Snakes of India,
 Journ., Bom. Nat. Hist. Soc., Vol. XVIII, p. 525.

1 Cumballa Hill, Bombay (J. R. Needham); 1 Malabar Hill, Bombay
 (N.B. Kinnear); 2 Malabar Hill, Bombay (W. S. Millard); Bandra,
 Salsette (Prof. J. P. Mullan); Andheri, Salsette (Prof. J. P. Mullan);
 Santa Cruz, Salsette (Col. Forbes); Andheri, Salsette (S. H. Prater);
 Bandra, Salsette (R. W. Dunlop) Malabar Hill, Bombay (Sir Stanley
 Reed).

Form.—Head flat, heart shaped, neck slender constricted, eye large, body
 smooth slender gradually increasing in girth from the neck down
 wards, scales 21 rows, ventrals 229-269, sub-caudals 79-92.

Colour.—Light-yellowish-brown, back and sides with zig-zag white
 black-edged markings.

Note.—Bears a superficial resemblance to the saw-scaled viper, *E. carinata*,
 in shape and colour.

Habitat.—*Peninsular India.* To the Himalayas. *Punjab. Sind. Baluchistan. Transcaspiæ. N.W. Frontier. Western Himalayas.* Subathu.
 (Ind. Mus.) Almora. (F.W.) *Eastern Himalayas.* Sikkim. (F.W.)
Bengal. As far East as Calcutta. *Ceylon.* Uva Prov. (Haldamulle.
 F.W.) (Wall.)

Dryophis mycterizans (Linn.). *Green Whip Snake.* "Hira Samp."

D. mycterizans (Linn.) Boulenger, Fauna British India, Reptilia, p. 370;
 Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc.,
 Vol. XVI, p. 533. Coloured Plate.

Malabar Hill, Bombay (Major Kilkelly); Malabar Hill, Bombay (Lt.-
 Col. H. Child); Malabar Hill, Bombay (B.N.H.S. coll.); 1 Bombay
 (Rev. Fr. Dreckman); Ladies' Gymkhana, Malabar Hill (W.S.
 Millard); Parel, Bombay (Col. Glen Liston); Andheri, Salsette (S. H.
 Prater); Bandra, Salsette (Prof. J.P. Mullan); 1 Bombay (Prof. J. P.
 Mullan); Santa Cruz, Salsette (R. W. Dunlop); Bombay (F. Birkett
 6' 11"); Santa Cruz, Salsette (M. Fox).

Form.—Extremely slender and whip like, snout narrow and pointed.

Colour.—Bright Green, a yellow line along each flank. The skin between
 distended scales black and white.

Note.—On trees and shrubs, in gardens and open jungle.

Habitat.—*Ceylon. Peninsular India.* Excluding the Valley West of
 Patna. *Bengal. Eastern Himalayas. Assam. Burma. Siam. Indo-China.*
 (Wall.)

Series.—PROTEROGIYPHA.

Sub-Family.—HYDROPHINÆ. Sea Snakes.

Hydrus platurus (Linn.). *Yellow-bellied Sea Snake.*

Hydrus platurus (Linn.) Boulenger, Fauna Brit. India, Reptilia, p. 397;
 Wall, Common Snakes of India, Journ., Bom. Nat. Hist. Soc.,
 Vol. XXVI, p. 803. Descript. and col. plate.

1 Bombay Harbour (S. H. Prater); 1 Bombay Harbour (Major C. H.
 Ward); 1 Bombay (Mr. Nigel Kerr); Bombay Harbour (Prof. J. P.
 Mullan); 7 Bombay Harbour (H. M. Phipson, Journ., Bom. Nat.
 Hist. Soc., Vol. III, p. 52; *H. bicolor*).

Form.—Eel like, head long; tail as in other sea snakes flat and paddle like.
 Scales 45-57 rows, ventrals not distinct.

Colour.—Variable. Usually uniform, black above, yellow beneath, tail
 yellow with black spots or cross bands.